**BITS F464**

**Machine Learning**

**Implementing Fisher’s Linear Discriminant Analysis and Perceptron algorithms**

**Technical Design Document**

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**Introduction**

The python classes are implementation of the Fisher’s Linear Discriminant Analysis and Perceptron algorithms that also shows graphs visualizing the one-dimensional line from LDA on the dataset and the decision line changing based on the training iteration from the Perceptron algorithm.

**Overview**

**Fisher’s Linear Discriminant Analysis**

This was implemented by computing each class data’s mean, overall data’s mean, within class variance for each class and using the within class variance, the total dataset’s variance. The total dataset’s is further used in the result from the Fisher’s algorithm along with the individual class mean vectors to give the weight vector. The graphs are further plotted using the resulting weight vector and normal distribution of the data.

**Perceptron Algorithm**

This was implemented by updating a uniformly initialized weight vector based on the error by misclassification of each training data - Stochastic Gradient Descent. The decision line is visualized using trained weight vector after each iteration.

**Software Development Tools and Libraries**

Git and Github were used for version control.

The application was developed in a Python 3.6 environment, making use of the pip, numpy, pandas and matplotlib libraries.